

Print and Photocopy Service System Design Using Mobile Based Waterfall Method

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ABSTRACT

In today's modern era, archived documents have become crucial as supplements to reports and sources for evaluating work performance. However, many photocopy shops in the Balun Ijuk to Gabek Dua region still lack computerized systems. Consumers must physically visit and queue to receive services from printing and photocopying service providers. This research aims to address the inefficiencies in the printing and photocopying service industry by developing an information system that facilitates location and order processing. The software development methodology employs a waterfall approach, encompassing analysis, design, development, testing, and maintenance. The developed mobile application enables users to locate nearby shops, place orders, and make payments seamlessly. The results demonstrate that the application system enhances the operational efficiency of printing and photocopying services, ultimately saving time and costs for users. This study highlights the significance of utilizing technology to streamline business operations and elevate user experiences in the printing and photocopying service sector.

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ABSTRAK

Di era modern, dokumen diarsipkan sebagai pelengkap laporan dan sumber penilaian keberhasilan pekerjaan. Namun, masih banyak toko fotokopi di wilayah sekitar Balun Ijuk sampai Gabek Dua yang sistemnya belum terkomputerisasi. Penelitian ini bertujuan untuk mengatasi inefisiensi industri jasa percetakan dan fotokopi dengan mengembangkan sistem informasi yang memudahkan lokasi dan proses pemesanan. Metode pengembangan perangkat lunak menggunakan air terjun, meliputi analisis, desain, pengembangan, pengujian, dan pemeliharaan. Data dikumpulkan melalui observasi, wawancara, dan studi literatur Aplikasi seluler memungkinkan pengguna mencari toko terdekat, memesan barang, dan melakukan pembayaran dengan lancar. Hasilnya menunjukkan sistem aplikasi meningkatkan efisiensi operasional layanan cetak dan fotokopi, serta menghemat waktu dan biaya bagi pengguna.

I. Introduction

At this time, almost all fields require documents that are archived as a complement to activity reports and as a reference source for evaluating success in a job. The development of increasingly advanced and sophisticated technology in this day and age means that many people are getting more and more benefits [1], especially at work. In general, individuals and companies prefer to archive data and reports in hard file form. Archiving in soft file form is usually stored as a backup document. It should be noted that there are several functions of archiving, including: supporting the decision making process, supporting the planning process, supporting supervision, as a tool of evidence, as organizational memory, and being used for public and economic interests [2].

To reproduce archives that will be made into hard files, a photocopier is used. But unfortunately, not everyone has a photocopier, so having a photocopier is very important. For many people, the easiest way to find the nearest photocopy location quickly and practically is to ask someone who knows about it. However, not all photocopying places have complete and adequate facilities, and buyers also usually don't know the price of the goods in the photocopy, which makes it difficult for buyers to calculate the costs they have to incur. As technology develops increasingly rapidly, another alternative that can be used to find a location for photocopying is to utilize technological applications that are much more practical. It cannot be denied that today's technology has made many processes more practical and comfortable. However, there are still several activities that do not utilize information systems optimally in carrying out their business processes. One of them is a print and photocopy service provider whose business process still uses a system that is still manual and takes a lot of time [3].

In general, consumers have to come and queue first to get services from print and photocopy service providers [4]. Consumers still rarely know the schedules, prices, and locations of good photocopying places. Therefore, an information system is needed that can help facilitate the business processes of companies providing printing and photocopying services. This research aims to overcome inefficiencies in the printing and photocopying services industry by developing an information system to facilitate the location and ordering process for consumers. So, this research is useful for finding out the best alternative that consumers can use to find locations for photocopying places that have good quality. This system can help consumers save time and costs in carrying out the payment process [5].

II. Methodology

Previous research conducted by Jovi & Nurudin (2022) [6] only discussed the development of a printing management information system for a specific printing business and did not discuss a mobile-based interface or system. This current study fills this gap by adding a discussion of the development of a printing and photocopying service system that can be used by many providers of these services, providing an interface to make the system easier to access for users, and discussing the waterfall system development method in more detail.

Previous research conducted by Agus & Marsela (2022) [7] only focused on the development of a system for the customer side based on the web and mobile. While this current study includes an integrated system for the customer, seller, and admin sides.

The lack of a detailed explanation of the research methodology and procedures used to develop the system and the absence of real images of the application or system developed in previous research by Refindo (2021) [3] made it difficult for users to see the results. This current study adds an interface and a more detailed explanation of the research methodology to make it easier for users to understand the system being developed.

A. Research Methods

The method used in developing this software is the waterfall method. The following is what the author uses for this research method, namely:

1. Analysis

System analysis is used to study the system currently running in a company, the aim is to get a clear picture of the problems that exist in the system [8]. At this stage, an analysis of the system requirements to be created, problems to be created and system solutions to be created is carried out. Information can be obtained through interviews or surveys directly at the destination location. The results of this stage will be used as a reference in designing applications for managing data from companies providing printing and photocopying services.

2. System Model Design/Design

After carrying out the analysis, the next stage is designing by translating the software requirements into design form, so that they can be implemented into a program at the implementation stage. The system design in this research uses the UML (Unified Modeling Language) model, which consists of several diagrams, namely: Use Case Diagram, Activity Diagram and Database Relations.

3. System Development

After designing the system model, the next step is to translate the results of the design that has been carried out into system creation. The author will implement the system according to the predetermined design and programming language so that it can be run properly.

4. Testing

At this stage, system testing will be carried out, which aims to find errors or failures in a system that has been designed.

5. Maintenance

The finished software is run and maintained. The final stage of the waterfall method is useful for correcting errors that were not found in the previous step.

B. Method of Collecting Data

In collecting the data carried out in this research, several techniques were used, namely:

1. Observation

Survey to collect direct data regarding research objects, where this activity was carried out directly in searching for photocopying locations in the areas around Balunljuk, Selindung, Gabek Satu, and Gabek Dua, which were obtained by students from photocopy shop owners in which the data collection process was carried out by the shop to work together. in the basic process of creating a design/prototype of an application system.

2. Interview

This method is a form of data collection that involves asking questions directly to the photocopier by asking for their name, address, contact number, and items available at the photocopy shop.

3. Literature Study

Search from sources related to the same solution, such as articles, magazines, books, etc. This aims to learn how to create, design, and design systems using UML. In developing a mobile-based print and photocopy service information system, a software development approach using the waterfall method was used. This approach was chosen because it provides a clear structure and well-defined stages, making it possible to control the project more efficiently.

III. Results

This research was conducted in the areas around Balun Ijuk, Selindung, Gabek Satu, and Gabek Dua. In this research, the author created a design in the form of a mobile application based on the results of a problem that needs analysis. In this research, the author suggested creating a mobile-based module for searching and ordering goods or photocopy shop services. The application system designed aims to digitize the ordering system and also search for photocopy shop locations, so that consumers can easily re-order the items they need when they run out without having to queue and wait for services to order and pay [9]. The system development method used in this research is the mobile-based waterfall model. This waterfall model provides a sequential or sequential software life flow approach starting from analysis, design, coding, testing, and support stages [10].

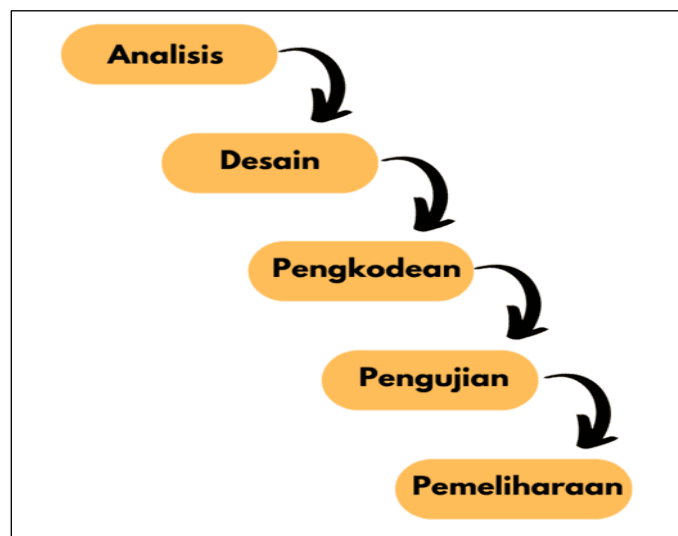


Figure 1. Stages in the Waterfall Model

At the design stage of this process, the author uses UML (Unified Modeling Language) to model the system to be created. Unified Modeling Language (UML) is a visual model that uses an object-oriented paradigm to describe, explain, organize and document information system development [11]. In UML, there is a modeling stage that consists of various types of UML diagrams, such as use case diagrams, activity diagrams, and class diagrams [12].

A. Unified Modelling Language

1. Buyer Use Case Diagram

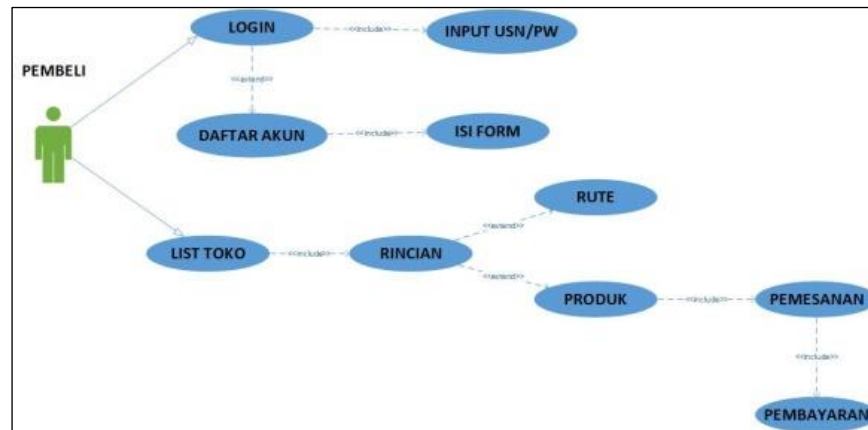


Figure 2. Buyer Use Case Diagram

Use case diagrams are image patterns that show the behavior or habits of a system, which are used to find out what functions are contained in an information system and who can use these functions [13]. Use case diagram is a description of the interactions that occur in the system and its users [14]. The actor in the diagram above is the buyer. The buyer acts as a user. As explained in Figure 2, users can register an account, log in, see a list of photocopy shops, see details of shops containing products and travel routes to photocopy, as well as make purchases and payments [15]. This use case enables new buyers to create an account within the application, allows buyers to access their accounts using their registered credentials, to search for photocopy shops based on various criteria, such as location, services offered, and pricing, enables buyers to view detailed information about a selected photocopy shop, allows buyers to browse the list of products available at a selected photocopy shop, place an order for photocopy services. Buyers can review the details of their order before submitting, track the status of their orders, make payment, and access a record of their previous orders.

2. Activity Diagram

Figure 3. is an activity diagram image that contains all the processes running in the system. According to Tohari in research writing [16] "Activity diagrams model business process workflows and the sequence of activities in a process. This diagram is very similar to a flowchart because it models the workflow from one activity to another or from activity to status" [17]. The diagram explains the process for a user to register an account and log in, then the admin will check the data match and verify the user account. After going through this process, users can look at the list of existing shops, see travel routes or make an order and then pay. The admin will record and report payments to the seller so that the goods ordered are processed immediately. After making payment, buyers can immediately take the goods to the photocopy shop [2].

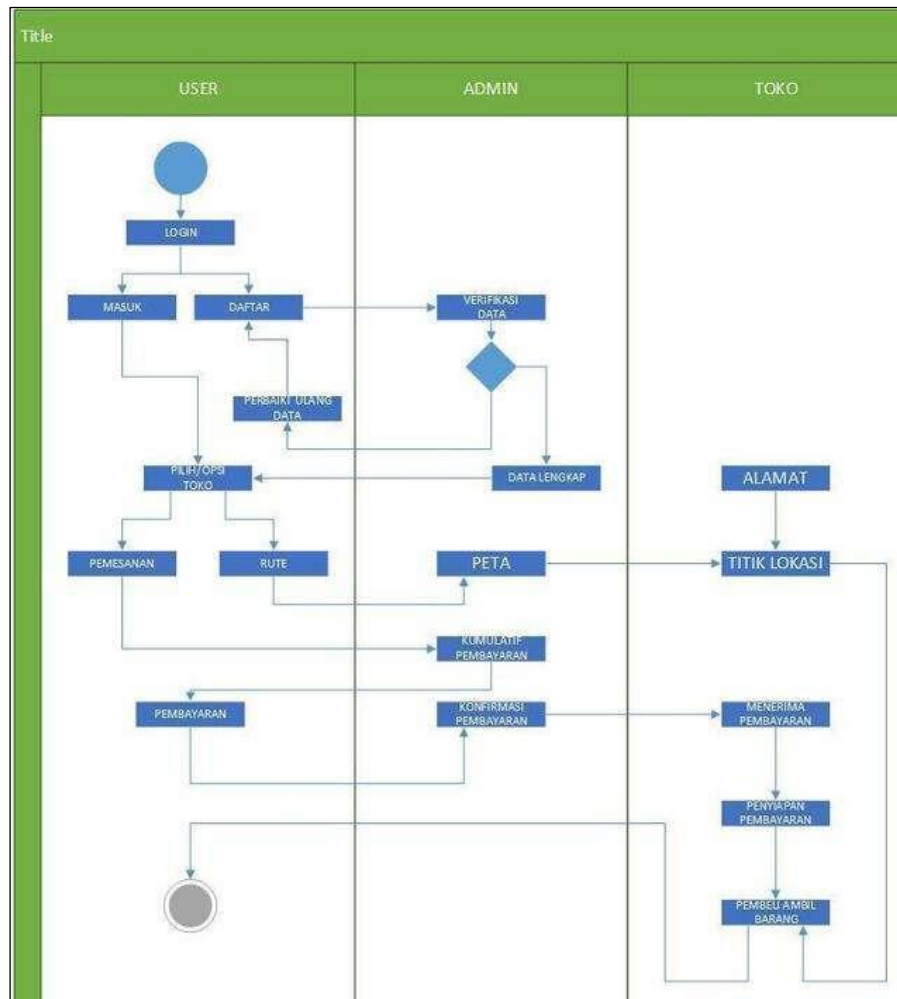


Figure 3. Activity Diagram

3. Entity Relationship Diagram

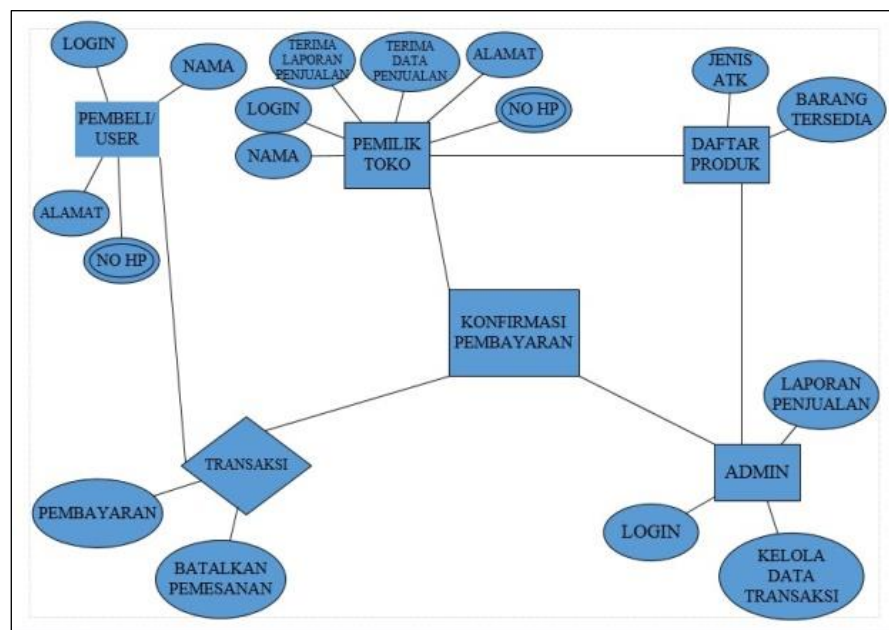


Figure 4. Entity Relationship Diagram

When creating a website, an ERD design is also required to make it easier to map data in the database. An Entity Relationship Diagram (ERD) is a diagram in the form of graphic notation that is used in creating a database that connects one piece of data to another [18]. In Figure 4 above, each related entity is connected by a relationship, and there is a line as a link between the entity and the relationship. The image above is an example of how the relationships between entities are connected to each other [19].

The relationships between the entities are as follows, a User can place many orders. This is represented by the one-to-many relationship between the User and Order entities. A Shop can have many products, this is represented by the one-to-many relationship between the Shop and Product entities. An Order can be for one products, this is represented by the one-to-one relationship between the Order and Product entities. ERD is useful for understanding the data that will be stored in the application database. It can also be used to identify potential problems with the application design. For example, ERD indicates that a user can order a product that is not available in the store. This is an issue that needs to be addressed in the application logic.

IV. Discussion

After designing UML, the next stage is designing the user interface which will later be implemented. This User Interface design aims to make it easier for users to use this application because it prioritizes user comfort and security.

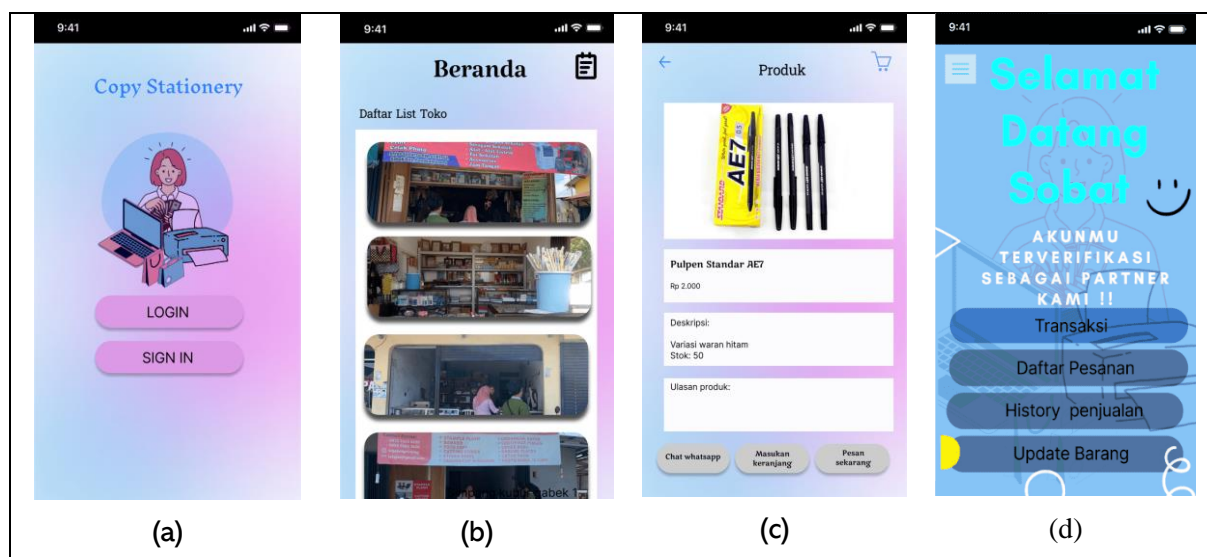


Figure 5. (a) User Login Page; (b) User Home Page; (c) User Product Page; (d) Buyer Home Page

In Figure 5 (a) the application home page has a login and sign-in menu. To enter the home page, the user must first enter or register an account. In Figure 5 (b) on the home page, the user can determine the location of the nearest print and photocopy service shop that has complete facilities. On the product page in Figure 5 (c) users can choose items according to their wants and needs. Then on the next page, Figure 5 (d) is the login display for sellers. On this page, sellers can manage transaction data, manage order lists, view sales history, and also update items to be sold.

V. Conclusion

This research identified challenges such as limited information about store locations, prices, and services. The printing and photocopying industry, which previously used traditional methods to run their business, can now be improved with the help of information technology. By developing mobile-based information systems, consumers and business owners can benefit from more efficient and transparent workflows. In addition, consumers can save time and energy because they can find the nearest photocopy location, find out prices, and even place orders online without having to physically visit the store.

To overcome this problem, the study proposed a mobile application that allows users to search for photocopy shops, view details and menus, and order services conveniently. This has a positive impact on society because the use of mobile applications helps consumers save time and effort in searching for stores, giving them the option to compare locations and services before making a decision, while businesses can gain new customers and simplify their ordering process.

However, this study also revealed several areas that require further research. For example, the impact of these applications on consumer privacy and data security needs to be further explored. Additionally, a more in-depth evaluation of the adoption of this technology by small and medium-sized businesses is needed, and how it affects their business practices. Future research could focus on developing additional features for these applications, such as online payment integration and improvements to the user interface for a better experience.

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